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EQUITY REASEARCH - REN

BERNARDO CALADO MENDES GORDO

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SUPERVISOR:

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Abstract

This dissertation aims to estimate the equity value of Redes Energéticas Nacionais (REN), as well as the intrinsic value of REN's share. REN is a utility company usually referred as transmission system operator or grid operator. The company is quoted in PSI 20 and operates in the following business segments: electricity, natural gas and telecommunication.

The valuation is done considering the different segments where the company operates and using the Discount Cash Flow (DCF) model, more specifically the Adjusted Present Value (APV) model. We also perform a sensitivity analysis and a Monte Carlo simulation. To check the robustness of our results, we also perform a Relative Valuation with the Multiples approach. The results were according to the DCF analysis.

Our analysis suggests that REN's shares at 31.12.2016 were undervalued. The trading value of the shares in that day was 2.68 €, which is below the intrinsic value of 2.99€ as calculated by DCF analysis with APV method. The superior intrinsic value represents a 11.74% upside potential in relation to the trading value of the share of 2.68€. The relative valuation by the Multiples approach indicates an intrinsic value of the share between 3.66€ and 7.74€ which were according to DCF analysis.

Resumo

Esta dissertação tem como objetivo estimar o valor patrimonial da Redes Energéticas Nacionais (REN), bem como a estimação do valor intrínseco das ações da REN.

É uma empresa de serviços públicos que se caracteriza por ser um operador de rede. A empresa está cotada no PSI 20 e opera nos seguintes segmentos de mercado: eletricidade, gás natural e telecomunicações (considerado como "outros" ao longo do relatório).

A avaliação é elaborada considerando os diferentes segmentos onde a empresa opera e usando o modelo dos Fluxos de Caixa Descontados, mais especificamente o Adjusted Present Value (APV).

Também elaborámos uma análise de sensibilidade e uma simulação Monte Carlo para avaliar a robustez dos resultados.

Elaborámos igualmente uma Avaliação Relativa com o método dos Múltiplos. Os resultados foram de encontro à Análise dos Fluxos de Caixa Descontados.

Como último componente da nossa avaliação, foi realizada uma avaliação relativa com a abordagem dos Múltiplos. Os resultados foram de acordo com a análise DCF.

A nossa análise sugere que o valor das ações transacionadas da REN no dia 31.12.2016 estão subvalorizadas. Foram transacionadas a 2.68 € e o valor intrínseco é 2.99 €, apresentando uma potencial variação positiva de 11.74%. Valor intrínseco da ação de acordo com o modelo dos Múltiplos está entre 3.66€ e 7.74€.

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Abbreviations

APV – Adjusted Present Value

CAPEX – Capital Expenditures

CAPM – Capital Asset Pricing Model

D – Debt

DCF – Discounted Cash Flow

E – Equity

EBIT – Earnings before Interests and Taxes

EBITDA – Earnings before Interests, Taxes, Depreciation and Amortization

EV – Enterprise value

FCFF – Free Cash Flow to Firm

G – Growth rate for perpetuity(2021 and perpetuity)

OPEX – Operational Expenditures

OTM – Overall Technical Management

PV – Present value

RAB – Regulatory Asset Based

REN – Redes Energéticas Nacionais (National Energy Networks)

Rf – Risk free rate

RoR – Return on RAB

T – Tax rate

WACC – Weighted Average Cost of Capital

VHV – Very High Voltage

1. Introduction

Redes Energéticas Nacionais (REN) is a Portuguese company, which is one of the most efficient European energy transmission system operators. Its business focuses on two main areas: electricity and natural gas. In addition, it operates in the telecommunications sector with RENTELECOM, which includes infrastructures, consultancy, and services. The electricity business relates to the transmission of high voltage electricity and technical management of the National Electricity Grid. Also, REN owns 100% of Enonda - Energia das Ondas S.A. and has the concession granted by the government, as a result of Portugal's commitment to renewable energy. The natural gas business relates to the transport of high-pressure natural gas and the technical management of the national natural gas system. REN ensures the storage, reception and, in the last phase, the regasification and underground storage.

In this study, we do an equity research to find the intrinsic value of REN's stocks and enterprise value. In the end, we estimate a price target and suggest an investment strategy for the investors.

The valuation is not always an accurate process. Many factors can affect the value of the company and there are many models to be adopted. In this equity research, we take into consideration all the possible key value drives of the company, market, and country.

Considering that debt in REN's capital structure is preponderant, and that the capital structure will be changing over the next years due to REN's intention to reduce the cost of debt, we apply the Discounted Cash-Flow (DCF) model, more specifically the Adjusted

Present Value (APV) model. Since REN financial performance is very solid every year, and there are plans for improving and optimizing debt, it is expected that the capital structure and the debt weight will change over the period. To complement the valuation analysis, we carry out a sensitivity analysis and a Monte Carlo simulation. In addition, we compare REN with its direct peers and apply the Relative Valuation model.

REN's share price was 2.68 Euros on January 1st, 2017. This is the price and date considered for the valuation, and all the subsequent values are the intrinsic value of 2.99€ from DCF analysis with APV model, with an upside potential of 11.74%. The value obtain from the sensitivity analysis is according to the DCF, undervalued. Last, the intrinsic value of the REN's share is in between 3.66€ and 7.74€, according to Multiples approach.

The structure of this dissertation is the following: the next section presents the literature review in order to choose the most appropriate model. Afterwards, we present a company overview, where we include the characteristics of the company/group and take into consideration the information for the 2015-2018 triennium. This section includes information about the company, the market, and the business environment. The macroeconomic framework and the strategy adopted by REN is presented in section four. Section five presents the methodology, the assumptions of the estimated periods, and all the information about the valuation models. All the results and the calculation process of the valuation are also included in this chapter. Section six presents a sensitivity analysis and section seven presents a Monte Carlo simulation. The relative valuation with the multiples approach, analyses of the peers and sector valuation are presented in section eight. In the end, a conclusion of the entire work and results was included.

2. Literature Review

2.1. Company Valuation

Valuation is probably the most important and used concept in the finance. It is considered the entire soul of Finance (Damodaran, 2006). Valuation is used in studies on market efficiency, when comparing different decision rules of investment in capital budgeting. It also applied in mergers and acquisitions but most importantly, valuation helps firms to determine their sources of economic value creation and destruction (Fernandez, 2007). To sum up, valuation is used for many different purposes (Fernandez, 2007): to valuate companies, to value the strategic decisions and to identify the value drivers.

The main goal of valuation is to give potential buyers and owners a close value of the company actual worth (Steiger, 2008). This approximate value can be determined by different approaches. However, all of them have some common guidelines when identifying the value of a company. The company's value is guided by its ability to grow and earn a good return on invested capital. (Koller, et al., 2015) In a market economy, the dimension of measurement is what we call the value. For example, if we have a budget for investments, we would expect the value of each investment to increase and grow by an amount sufficiently higher than its cost. Hence, we would profit in the end, compensating the risk we took during this period of time. This assumption is correct for any type of investment, whether they are derivatives, deposits, bank accounts, shares or bonds. All of them aim to sell the investment above its cost, thus compensating for the risk taken.

Taking into account the long-term interests of not only the shareholders but also the stakeholders, valuation is an extremely helpful concept for measuring and identifying the range of performance in any kind of company or firm (Koller, et al., 2015).

The ability to evaluate something is the worthiest financial analytical skill any manager should master today, by learning how to maximize the value of a company being the most important skill than a manager can have. For this reason, the valuation ability is today a prerequisite to be considered in the company's resource allocation decisions (Luehrman, 1997). It is the company's best interest that its employees, stakeholders, shareholders and customers are happy and satisfied with the value offered to them by the company. Indeed, according to a growing body of research, a company that maximizes the value for all the shareholders will create more employment in the long-term and would see its employees happier and satisfied. This will set a trademark as a responsible company from an outside (and internal) perspective (Koller, et al., 2015).

2.2. How to Evaluate

"One might expect universal agreement on a notion as fundamental as value, but this isn't the case: many executives, boards, and financial media still treat accounting earnings and value as one and the same, and focus almost obsessively on improving earnings. However, while earnings and cash flow are often correlated, earnings don't tell the whole story of value creation, and focusing too much on earnings or earnings growth often leads companies to stray from a value-creating path." (Koller, et al., 2015, p. 18) To solve this problem, Damodaran (2006) proposes four "universal" methods of valuation:

-Asset Based Valuation

-Contingent Claim Valuation

-Relative Valuation

-Discounted Cash Flow Valuation

These different approaches have some guidelines that are applied to all of them (Steiger, 2008), since the valuation models share common points, even with different assumptions (Damodaran, 2006).

2.3. Valuation Methods

2.3.1. Asset Based Valuation

The Asset Based Valuation methods aim to identify the firm's value by estimating the value of its assets (Fernandez, 2007). These Asset Based Valuation methods are usually used to determine the value of a company through the balance sheet. Therefore, they do not consider the company's growth, changes in the market and other factors that may influence the future performance of the company. Asset Based Valuation is made by analysing each asset separately (Damodaran, 2006).

According to Abraham, Bello & Brown (2008), the Asset Based approach is defined as a common way of determining a value indication of a business.

There are four different models for applying this method: book value, adjusted book value, liquidation value and the substantial value (Abraham, et al., 2008); (Fernandez, 2007); (Damodaran, 2015).

2.3.2. Contingent Claim Valuation

This valuation method uses the option pricing models to measure the value of assets that share option characteristics (Damodaran, 2012). The traditional models are unable to adjust to market changes or any other external factor (Ammann, 1999). These Option Pricing methods are able to adjust to changes in the market, providing the analyst with an alternative valuation overview (Damodaran, 2012).

If the option captures the contingent nature of the project, by pricing the option we will sometimes gain some additional information or insight into the value of the project (Luehrman, 1997), which is an advantage regarding the traditional methods of valuation.

An option is valuable and the value of the option depends on the value of an underlying asset: the stock (Luehrman, 1997). According to Luehrman (1997), the opportunities of the business environments are not handle in the Discounted Cash Flows (DCF) valuation. Thus, even the simplest option-pricing analysis provides a worthwhile insight, even if it is not the most sophisticated one. The quality of the results is higher when using the option-pricing as a supplement to traditional DCF methods (Luehrman, 1997).

There are different tools to evaluate simple options: The Black-Scholes option-pricing model (Luehrman, 1997).

2.3.3. Relative Valuation

The Relative Valuation aims to compare the value of an asset with the values assessed by the market for similar assets (Damodaran, 2012). First, we need to identify the assets that are comparable and then obtain the values for those assets. Afterwards, we need to

standardize the values obtained by creating multiples of prices. Lastly, we compare these values in order to verify if it is over or under valued (Damodaran, 2012).

The Relative Valuation method is used by many analysts due to its fewer restrictions and its simplicity. This method is based on the accounting figures of the company (Nordin, 2008). Being simpler than the DCF methods has the advantage to make the information more clear and understandable for the stakeholders.

According to Damodaran (2012), Relative Valuation is much more likely to reflect market perceptions than DCF models. When using Relative Valuation there is a significant proportion of securities under or overvalued. So, the Relative Valuation method is more tailored for the needs of portfolio managers because they are judged on their performance on a relative basis.

2.3.4. Discounted Cash Flows

The DCF method discounts the expected cash flows of an asset, by applying a rate that reflects the real risk of the asset. We call this value, the intrinsic value of the asset (Damodaran, 2004). We can apply three main models of the DCF: Firm Valuation models, Equity Valuation models and the Adjusted Present Value model (Damodaran, 2002).

Firm Valuation models are used when analysing a firm with high leverage, which is expected to change over time. Firm Valuation models are used when only partial information about the leverage is available or when we are interested in doing a valuation about the firm and not the equity (Damodaran, 2002). The two models most used in Firm Valuation are the Economic Value Added (EVA) and the Free Cash-Flow to the Firm, also known as Weighted Average Cost of Capital (WACC) model. EVA is a value-based financial

performance measure, which is also an investment tool that reflects the absolute amount of shareholder value created. EVA is calculated as the product of the excess return on an investment (Geyser & Liebenberg, 2003). It is the amount by which earnings exceed or fall short of the required minimum rate of return that investors could have earned if they had invested in other securities of comparable risk (Stewart, 1990). The Free Cash Flow to the Firm is used by discounting the cash-flow available to all the claim holders in a firm using the WACC rate. Damodaran (2002) refers that WACC is the most viable method.

The Adjusted Present Value (APV) model is used when we value the firm as if it were fully funded by equity and then the effects of debt are added to that value. The APV indicates if the value of debt plus the shareholders equity is equal to the value of the company's unlevered shareholders' equity (Fernández, 2002). According to Luehrman (1997), APV is the best alternative for valuing a business operation. This method is based on the principle of value additivity.

3. Company Overview

3.1 Company History

As a national enterprise, REN manages and invests two main business areas: electricity and natural gas. In Portugal, the company operates its main transport infrastructure and generally manages its systems: national electric and national natural gas.

The company is strongly committed to a sustainable development and consistently invests in knowledge, development, and research.

The company was founded in August 1994, as a consequence of the split and division between *Energias de Portugal* (EDP) and *Direção Operacional da Rede Eléctrica*(DORE). However, its history began in 1947 when Companhia Nacional da Electricidade(CNE) became the pioneer company in Portugal working with electricity. In 2000, REN leaves the EDP group and in 2003, the company is named REN, Redes Energéticas Nacionais.

Until 26 September 2006 the REN Group's was concentrated on the electricity business through REN – Rede Eléctrica Nacional, S.A.. As a consequence of the unbundling of the natural gas business, the Group purchased the transport and storage of natural gas activities from Galp and Transgás, starting a whole new business. In 2007 the Company is transformed temporally in an holding company and while transfer the electricity business into a company formed on 26 September 2006, named REN – Serviços de Rede, S.A. From 2012 to 2016, REN has successfully concluded its privatization process. The evolution of shareholder structure of REN after and before the privatization is presented in Figure 1. The Portuguese government is under the "Others". State Grid of China has now 25% of the shares percentage and the other 36.9% majority are free float.

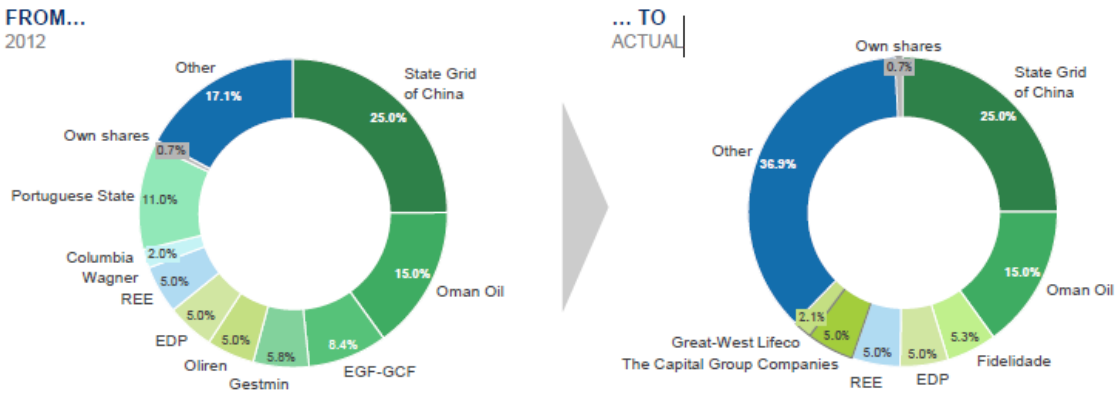


Figure 1 – REN Shareholder's structure and privatization (Source: REN Triennium 2015-2018 report)

3.2. Company Description and Sectors

REN Group is part of the grid operators sector. The company is a transmission system operator (TSO), managing the energy transmission systems that support the electricity and the natural gas transmissions.

REN has some peculiar characteristics. For example, it operates the transmission of VHV and OTM under a public concession, which lasts for 50 years. Furthermore, the reception, storage and regasification of liquefied natural gas are also under public concessions.

Although its two main businesses are electricity and natural gas, REN is also involved in the telecommunication sector with RENTELECOM SA. This company aims to explore the telecommunication network surplus capacity. This plays a key role to electricity and natural gas transmission and transportation.

The Electricity business includes the following companies:

- REN – Rede Eléctrica Nacional, S.A., REN Trading, S.A., Enondas, Energia das Ondas, S.A.
- The Natural Gas segment includes REN Gas S.A., REN Gasodutos S.A., REN Armazenagem S.A. and REN Atlântico S.A..

3.3. 2016 Achievements

In 2016, almost every month the company had an important achievement, each representing a step closer into the future.

In January, the company launched an app for investors to facilitate the access to information about the company (for example, profile and indicators) in one single platform.

May also represented a key moment for REN since it achieved the first place of the "Most Attractive Employers in Portugal". Considering the situation of the country, this award placed REN in a good position in the market. Also in May, REN was responsible for planting 54,000 native trees in Castelo Branco, which shows its great commitment to environmental issues, and it was included once again in the ranking of Best TSOs in the world. Later in 2016, REN won the "Best Report and accounts – Non-financial Sector" by IRGA.

However, the most important achievement in 2016 was the acquisition of 42.5% shares of Electrogás S.A., a transmission company in Chile.

4. Present Situation, Future Perspectives, Industry and Strategy

4.1. Economic and financial performance in 2014-2016

Table I presents the historical data and variation of revenues between 2014 and 2016.

Table I
Historical Revenues, EBITDA and Net Profit

	2014	g	2015	g	2016
Revenues	756 043 €	**8,35%**	819 145 €	**-9,73%**	739 451 €
EBITDA	507 066 €	**-3,41%**	489 779 €	**-2,55%**	477 278 €
EBITDA	302 961 €	**-7,55%**	280 095 €	**-6,55%**	261 743 €
EBT	188 796 €	**-3,85%**	181 523 €	**-0,07%**	181 402 €
Net Profit	112 778 €	**2,96%**	116 115 €	**-13,72%**	100 182 €

Source: REN Annual Report (2014, 2015, 2016)

REN's revenues decreased 9.73% from 2015 to 2016 and net profit decreased 13.72% in the same period. Among other reasons, such decreases were due to the selling of Enagás shares and the performance of the energy sector throughout the year. The company reported an increase in tax value of 38% (negative), which also reduced the net profit. This and the reduction of RoR explain the reduction of EBITDA and the net profit, keeping the RAB steady. The Gas RoR decreased from 7.3% in 2015 to 6.9% in 2016, a change by -0.4 p.p. that made the difference.

The net profit decreased greatly between 2015 and 2016 also due to CESE (Extraordinary Contribution on the Energy Sector), in a total of 25938 Million Euros. Without CESE, REN's net profit would have increased due to the reduction of its operational costs and the effort to reduce its financial costs. Portuguese Government stated that CESE will continue to be paid in 2017 by the energy sector and utilities.

The figure 2 shows the REN share performance:

Figure 2 – REN historical performance (Source: Markets Insider)

From 2014 to the beginning of 2016, REN's share price fluctuated around the same values, between 2.40 Euros and 2.75 Euros. During 2016, the price decreased to a low point of 2.50 Euros per share.

We highlight the fact that in the fourth quarter of 2016 the share price rose. This was due to the fact that the consumption of electricity in Portugal reached the highest point of the previous 5 years while the consumption of natural gas reached its high peak since 2011. Indeed, according to REN, the consumption of natural gas increased 28% in December 2016 when comparing with its consumption in December 2015.

The price decrease in the first semester of 2016 was due to the reduction of the net profit. The net profit at the end of the first semester was 40.6 million Euros, 35.4% less than at the end of the last semester of 2015. This smaller profit had a huge impact on the share price due to shareholder's speculation. As mentioned before, without the CESE penalization, REN would have a positive net profit, in terms of financial performance.

Share price is expected to grow in 2017 and 2018, especially due to the agreement established with Electrogás, in Chile. This agreement caused a very good impression on investors and shareholders. In fact, share price actually grew in the first semester of 2017 according to REN's report.

4.2. 2015-2018 Triennium Analysis

REN has three strategic aims for the period between 2015 and 2018.

First, REN aims to maintain local business as a top priority, develop international projects, and consolidate its financials. Under this aim, key goals are planned to be accomplished until 2018, for example to achieve an annual CAPEX average between 175 and 200 million Euros, making an international investment up to 900 million Euros for the first time, to maintain a stable RAB during this period.

Second, REN aims to ensure the investment grade rating. The investment grade was upgraded this year, which is now the best investment grade in Portugal.

Third, REN aims to keep the same yearly dividend of 0.171, the same dividend of the previous historical years. This will give REN credibility and gain the shareholders trust as is doing now. With such dividend values, REN is providing a dividend yield that is one of the best in the Europe industry of energy and in the Portuguese market.

Regarding the investment on international markets, REN will prioritize target markets according with its growth, market size and opportunity attractiveness, especially the emerging markets like Latin America and Africa, keeping the focus on electricity and gas transmission networks.

In December 2016, REN acquired 42.5% shares of Electrogás. This is an example of an international investment that met all criteria regarding the nature of investment, ownership strategy, and partnership strategy. In addition, the agreement was made with Enel Generación Chile, located in Latin America, one of the priority target markets.

Regarding the economic and financial aims until the end of 2018, REN intends to decrease EBITDA from 490 million Euros to 450 million Euros by reducing the RoR, and, as previously mentioned, to keep the RAB steady. It is expected that these measures will lead to an increase of the financial results due to the reduction of the cost of debt.

In fact, REN intends to reduce its cost of debt. So, it will have to maintain a flexible funding structure, allowing the future adjustment of the cost of debt to an improving market. On the other hand, it will have to decrease costs by arbitraging the funding sources.

Lastly, a key goal is to maintain the grade investment. REN is the only company in Portugal with 3 investment grades: FitchRatings, Moody's and S&Poors.

4.3. Strategy according to Macroeconomic Framework

REN principal aim is to turn into one of the best efficient energy transmission operators in Europe, creating value to the parts - shareholders, workers, clients and community in a sustainable development. REN will try to reach this goal by adding to its focus in Portugal with the pursuit of opportunities along the macroeconomic framework.

Portugal will remain REN's main and core market, where is continuing to invest while address Portugal's power and gas infrastructure long-term needs. The strategy is to aim the permanent drive to improve performance, in order to provide a solid and efficient service at the lower possible cost for the consumers and clients.

REN will work on the integration of electricity transmission, gas transport and facilities management. Operation efficiency is the key driver in the future for REN to take advantage of the good position it has along the peers.

Investing on R&D is part of REN's agenda as well as technological grid performance and promote environmental friendly initiatives.

REN will implement an internationalization agenda in the next three years while is starting already the business in Chile and aiming for Africa continent. In this moment, there is a great opportunity to find additional growth options. Also, REN will try to find lower regulatory and financial risk areas in emerging countries.

The opportunity above is getting bigger while recently there was an entry in the shareholder structure of two strategic partners (Oman Oil and State Grid), aiming and reaching the re-privatization process.

These two partners are an entry for the international business of REN because both groups are important keys in the global energy sector. REN is implementing its international strategy slowly and prudently, ensuring that the real opportunities fit with REN's values, while creating sustainable additional value for its shareholders.

REN is aiming for the result of being a company that, although still focused on providing an international class service in domestic area, is exploring all the new opportunities abroad, allowing a diversified revenues streams.

5. Valuation

Appendixes 1 to 4 presents the data used for valuation. It includes the historical and forecasting data.

5.1 Valuation Methods

We apply a DCF method to determine REN firm value. Taking into consideration the literature review, the big percentage of investors and the characteristics of the firm, we use DCF method. We chose APV as the valuation method because REN is optimizing its debt and, the company intends to reduce the cost of debt over the years. Also, the capital structure is reducing over the valuation period. To complement the results and analyse its robustness, a Sensitivity analysis and a Monte Carlo Simulation are presented in the chapter.

We then used a Relative Valuation method, choosing the Multiples approach. We selected a peer group composed of four companies in the grid operator sector with the same financial and economic characteristics as REN. We only choose companies that are Transmission System Operators (TSO). We exclude the distribution, exploration, and energy production companies. We only considered transportation companies as being a peer of REN in the market.

5.2. Key Assumptions

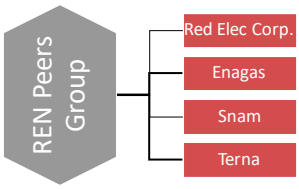
5.2.1. Unlevered Cost of Capital

To compute the unlevered cost of capital, we use the following inputs:

- The **risk-free rate** equals 0,21%, representing the yield to maturity of German 10-year bond in 31st December 2016.

- The **beta** is computed as the average between the Beta regression and the Beta based on REN's peers. The inputs for Beta regression are the monthly and weekly data for both REN's stock price and PSI-20 index from Bloomberg, with a range of five years. Then, the beta obtain based on REN's peers is 1.44 (see table II).

Table II
Beta computed



	β_L	E	$\frac{D}{E}$	τ		β_U	Total Debt	Net Debt	Market Cap
Red Elec Corp.	0,67	2 920 549 €	0,67	25%		0,44576	7 629 451 €	5 020 000 €	11 375 000 €
Enagas	0,66	2 462 936 €	1,01	22,30%		0,36941	6 784 064 €	4 250 000 €	6 701 000 €
Snam	0,48	7 586 000 €	1,02	30%		0,28057	17 294 000 €	13 700 000 €	17 031 000 €
Terna	0,52	3 555 000 €	0,98	14,52%		0,28324	11 441 000 €	7 520 000 €	11 700 000 €
					Média	0,34475			
REN	1,44074	1 159 216 €	1,77	21%			3 390 607 €	2 621 548 €	1 478 000 €

Source: Data analysis, Bloomberg, DataStream and Excel Spreadsheet for calculation and REN data.

- For the beta based on peers, we first select the peer group. Then we collect data to estimate the unlevered beta. Calculating the average between the beta regression and the beta based on REN's peers we were able to get a levered beta of REN of 0.94(see table III). The unlevered beta for REN equals 0.69(see table III).

- The formula used for Beta unlevered (where "t" is the tax rate, equals 21%, and the D/E of REN is 1.77, as showed in table II) is:

$$\beta_U = \frac{\beta_L}{\left(1 + \frac{D}{E}(1 - \tau)\right)}$$

Table III
Beta Regression and Final Beta Unlevered

Beta regression REN	(REN's stock price and PSI-20 used for B regression)		
Horizon	5Y	5Y	
Returns	Weekly	Monthly	Indústria
Unadjusted	0,513	0,557	
Adjusted	0,675	0,705	1,441
		1,218	
Beta levered REN	**0,940**	0,609	
Beta unlevered REN	0,691		

Source: Data Analysis and Beta Regression from Excel Spreadsheet

- The market risk premium used was 9,24% according to Damodaran 2016 tables for the Risk Premium in Portugal. See table IV

Table IV
Market Risk Premium

Country	GDP billions	rating	*Adj. Default Spread*	*Total Risk Premium*	*Country Risk Premium*	*Corporate Tax Rate*
Portugal	199	Ba1	2,89%	9,24%	3,55%	21,00%

Source: (Damodaran Tables 2016)

The formula used to compute Ru is:

Ku=Rf+βu×(Rm−Rf)

According to CAPM theory, the unlevered cost of capital (Ru) equals 0.066.

5.2.2. Cost of Debt

For the Cost of Debt, we use the synthetic rating method. The Cost of Debt equals 0.06.

We use the following equation and inputs:

Kd=Rf+default spread +country spread

- Following Damodaran's (2017) rating tables, we assume a default spread of 2,25%, for the investment grade BBB of REN (See appendix 6).
- The risk-free rate equals 0,21%, which is the equal to YTM of German 10-year bond in 31st December 2016.
- The country risk spread equals 3.55% as presented in appendix 5.

Table V shows the Cost of Debt results

Table V
Cost of Debt

Cost of Debt	
Rating	**BBB**
R_f	0,21%
Spread BBB	2,25%
Country Spread(CRP)	3,55%
Rd	**6,01%**

Cost of debt computed is 0.06.

5.2.3 Revenues

The forecasted revenues take into consideration REN's historical data and future expectations for each segment: Electricity, Natural Gas and Telecommunication. We use the triennium 2015-2018 report, which presents an overview of the future perspectives for the Electricity and Natural Gas segments, to estimate REN's revenues.

The **Electricity segment** represents around 70% of REN's sales. Its main driver is energy consumption. Combining the companies' information and *Entidade Reguladora dos Serviços Energéticos* (ERSE) predictions for 2017 and 2018, we expect a growth in

electricity consumption in Portugal, from 44 543 GWh in 2016 to 46 200 GWh in 2017. The energy consumption increases by approximately of 2%, reaching a new maximum level of consumption since 2011. According to REN triennium 2015-2018 report, the company projects a stable Return on RAB (RoR) for this segment, despite the decreasing RoR from 2015 to 2016 due to regulations. Table VI presents the REN's RoR.

Table VI
Return on RAB Electricity (%)

RoR(%)	2014	2015	2016	2017F	2018F	2019F	2020F	2021F
Electricity	**7,76%**	**5,99%**	**5,80%**	**5,86%**	**5,91%**	**5,97%**	**6,02%**	**6,08%**

Source: REN Triennium Report 2015-2018 and forecasting assumptions

As the RoR is indexed to the average Portuguese sovereign 10-year bond yields, we expect stable growth on REN' revenues given the Portuguese' optimistic outlook for the country sovereign debt.

The average Regulatory Asset Base(RAB) is another driver of the REN's revenues, which according to the company, will slowly decrease in the next years as shown in the Table VII.

Table VII
Average RAB Electricity (€)

Average RAB(€)	2014	2015	2016	2017F	2018F	2019F	2020F	2021F
Electricity	**2 128 000**	**2 149 400**	**2 152 600**	**2 151 524**	**2 150 448**	**2 149 373**	**2 148 298**	**2 147 224**

Source: REN Triennium Report 2015-2018 and forecasting assumptions

The last driver considered is the OPEX. According to REN, the OPEX will increase by 1.5% until 2018, induced by grid expansion and new ERSE regulation. With the new regulation, the operational expenses are optimized, with a 2% growth on electricity efficiency factor. We assume an increase on revenues in electricity from €138 613 Million (2018) to

€150 494 Million in 2019, assuming that REN will continuing to expand its grid and networks.

The historical data registered an increase in Electricity revenues of 3.49% from 2015 to 2016. Considering the previous information and the positive macro-economic outlook for Portugal, we expect an annual revenues' growth rate for electricity of 4,20% to 2017 and 2018. For 2019 and 2020 the growth will be at slightly slower, estimated at 3% and 2%. The decrease on the growth rate for 2019 and 2020 is due to the lack of future investment information by REN. For the perpetuity, we assume a growth rate of 0,5%.

The Natural Gas segment represents around 29% of REN's sales. In 2014, Portugal consumed 4.1 billion cubic meters of natural gas. The consumption increased to 5.2 billion cubic meters in 2016. This represent an upside growth of 27%. The natural gas consumption growth rate in 2016 was of 3.4%, below from the all-time high recorded in 2010.

According to the Energy Outlook for 2020, natural gas consumption has a stable and increasing outlook for the next 4 years. The European producers will have increased their production by 5,46%, and consumption will continue to increase. This will reflect on the in revenues of the transportation companies and grid operators, such as REN.

Table VIII presents the RoR for natural gas. This increasing trend of RoR will impact positively on REN's natural gas revenues. The value of 6% in RoR of 2016 is according to ERSE's regulatory framework.

Table VIII
Return on RAB Natural Gas (%)

RoR(%)	2014	2015	2016	2017F	2018F	2019F	2020F	2021F
Natural Gas	7,46%	7,34%	6%	**6,06%**	**6,11%**	**6,17%**	**6,22%**	**6,28%**

Source: REN Triennium Report 2015-2018 and forecasting assumptions

The RoR is increasing due to the stable RAB. RAB will slowly decrease according to REN triennium information. The stable RAB will allow an increase on RoR having a crucial impact on the revenues growth. Table IX presents the average natural gas RAB.

Table IX
Average RAB Natural Gas (€)

Average RAB(€)	2014	2015	2016	2017F	2018F	2019F	2020F	2021F
Natural Gas	**1 107 000**	**1 155 000**	**1 116 100**	**1 115 542**	**1 114 984**	**1 114 427**	**1 113 869**	**1 113 313**

Source: REN Triennium Report 2015-2018 and forecasting assumptions

For Natural Gas segment, we assume a growth in revenues of 4,5% for 2017 and 2018, given the historical growth of the segment, the evolution of the main drivers and the sector outlook. For 2019 and 2020, and assuming that the regulation for the sector will stay equal, we estimate a growth in revenues of 3%. The perpetuity growth equals 1%.

Table X
REN Revenues Assumptions (thousand €)

REVENUES		2014	2015	2016	2017F	2018F	2019F	2020F	2021F
Electricity	Revenues	397 626	354 560	367 490	382 925	399 007	410 978	419 197	421 293
	g(%)		-10,83%	3,65%	**4,20%**	**4,20%**	**3,00%**	**2,00%**	**0,50%**
Natural Gas	Revenues	168 700	171 789	166 293	173 776	181 596	187 044	192 655	194 582
	g(%)		1,83%	-3,20%	**4,50%**	**4,50%**	**3,00%**	**3,00%**	**1,00%**
Others	Revenues	5 519	10 746	11 458	11 573	11 688	11 805	11 923	12 042
	g(%)		94,71%	6,63%	**1,00%**	**1,00%**	**1,00%**	**1,00%**	**1,00%**
Construction	Revenues	163 186	240 002	171 247	178 593	186 255	191 843	196 255	197 531
	g(%)		47,07%	-28,65%	**4,29%**	**4,29%**	**3,00%**	**2,30%**	**0,65%**
Other op. Income	Revenues	21 576	41 279	21 649	28 168	28 168	28 168	28 168	28 168
	g(%)		91,32%	-47,55%	**30,11%**	**0,00%**	**0,00%**	**0,00%**	**0,00%**
TOTAL	Revenues	756 043	819 145	739 451	775 035	806 715	829 838	848 199	853 616
	g(%)		8%	-10%	**4,81%**	**4,09%**	**2,87%**	**2,21%**	**0,64%**

Source: REN Triennium Report 2015-2018 and forecasting assumptions

The Other segment includes the Telecommunication segment. Since REN has no future projects for RENTELECOM in the telecommunication segment, we assume the growth in revenues of Others as being 1% from 2017 to the perpetuity.

The Construction revenues growth rate equals to the average between the growth rate of Electricity and Natural Gas segments.

The Other Operational Income revenues growth rate equals to the historical growth rate of the last three years.

Overall, revenues will increase by 4,81% in 2017, 4,09% in 2018, 2,87% in 2019, 2,21% in 2020 and 0,64% in the perpetuity.

5.2.4. EBITDA Assumptions

Table XI presents the forecasting assumptions for the EBITDA and EBITDA margins.

Table XI
EBITDA (thousand euros) and EBITDA margin (%), assumptions, 2016 and forecasting period

		2016	2017F	2018F	2019F	2020F	2021F
Eletricity	EBITDA	321 683	333 273	337 127	341 508	346 350	345 843
	EBITDA(m)	62,15%	61,43%	59,70%	58,79%	58,33%	57,88%
Natural Gas	EBITDA	145 565	150 810	167 277	177 372	183 998	187 899
	EBITDA(m)	67,88%	67,10%	71,50%	73,70%	74,80%	75,90%
Others	EBITDA	10 030	10 391	10 294	10 589	10 823	10 893
	EBITDA(m)	60,00%	60,00%	60,00%	60,00%	60,00%	60,00%
	TOTAL	**477 278**	**494 474**	**514 698**	**529 470**	**541 171**	**544 635**
	EBITDA(m)	**64,54%**	**65,00%**	**65,70%**	**66,00%**	**67,00%**	**67,00%**

Source: REN Triennium Report 2015-2018; forecasting assumptions and; REN Annual Report 2016.

For these assumptions, we take in consideration the historical data of three last years, the revenues growth rate and the REN's triennium 2015-2018 report.

According to the triennium report about the Electricity segment, we assume a decrease of almost 1pp in EBITDA margin in 2017 due to an increase of operating costs being a consequence of the investment done in the first semester in 2017. The investment will increase until 2019, which will cause a decrease in EBITDA margin of almost 2pp. This is justified by REN forecasted international investment between 100 and 150 Million Euro to expand the business segment. The domestic CAPEX is far superior in Electricity segment than Natural Gas. The difference is 500 Million Euros of Electricity domestic CAPEX to 200 Million in Natural Gas, for the next years. The average yearly CAPEX for Electricity is forecasted between 125 and 140 Million Euros for 2018. For 2020 and perpetuity, the Electricity's EBITDA margin is expected to stabilize, occurring a decrease of 0,5pp each year due to the stabilization of operating costs and investment decrease.

For the Natural Gas segment, the EBITDA margin is expected to decrease until the end of 2017 due to the international investment and the acquisition of Electrogás. In 2018 and 2019 the Natural Gas EBITDA margin is expected to increase in 4.40pp in 2018 and 2.20pp in 2019. This increase is justified by the increase in OPEX efficiency and the first major international investment in Chile. This acquisition will have a positive impact on REN and its EBITDA margin. In 2020 and perpetuity is expected a stabilization of EBITDA margin with a growth of 1.10pp for both periods.

5.2.5. Capital Expenditures and Depreciations Assumptions

By taking into consideration the average weight of Gross Intangible and Tangible Assets to the total sales, we assume a positive and progressive growth scenario between 2017 and 2021. We took into consideration the CAPEX historical behaviour and the objectives

of REN for the triennium 2015-2018, where CAPEX is predicted to stay between 175 million and 200 million euros for the year of 2018.

Depreciations were computed taking into account the average growth of the last three years. The forecasted values for the Depreciations and CAPEX are presented in Table XII.

Table XII
Depreciations and CAPEX

	2016	2017F	2018F	2019F	2020F	2021F
Depreciations	**215 535 €**	**211 173 €**	**219 810 €**	**226 118 €**	**231 116 €**	**232 595 €**
Growth rate(%)		-2,02%	4,09%	2,87%	2,21%	0,64%

	2016	2017F	2018F	2019F	2020F
CAPEX	**171 247 €**	**178 593 €**	**186 255 €**	**191 843 €**	**196 255 €**
Growth rate(%)		4,20%	4,20%	2,96%	2,27%

Source: REN Annual Report 2016; Data analysis and forecasting assumptions

5.2.6. Change in Working Capital Assumptions

The historical data of REN and variation in change working capital are presented in Table XIII and each item are discriminated in the balance sheet presented in Appendix 2 and 4.

Table XIII
Net working capital and change in net working capital

Working Capital	2015	2016	**2017F**	**2018F**	**2019F**	**2020F**	2021F
(+) Inventories	2 985 €	1 028 €	1 908 €	1 986 €	2 043 €	2 089 €	2 102 €
(+) Trade and other receivables	263 766 €	448 826 €	436 809 €	454 674 €	467 723 €	478 060 €	481 120 €
(+) receivable taxes	5 358 €	0 €	5 477 €	4 944 €	5 182 €	5 394 €	5 548 €
(+) Receivable Opeartional Deferred	0 €	0 €	0 €	0 €	0 €	0 €	0 €
(-) Trade and other payables	315 735 €	311 539 €	415 388 €	432 377 €	444 786 €	454 616 €	457 526 €
(-) Payable Operational Deffered	0 €	0 €	0 €	0 €	0 €	0 €	0 €
(-)Other liabilities	1 171 €	801 €	1 459 €	1 518 €	1 562 €	1 596 €	1 607 €
(-) Payable taxes	0 €	26 875 €	9 924 €	8 958 €	9 389 €	9 773 €	10 054 €
Net working Capital	**-43 626 €**	**110 639 €**	**17 424 €**	**18 751 €**	**19 211 €**	**19 557 €**	**19 584 €**
Change in Working Capital		**154 265 €**	**-93 215 €**	**1 327 €**	**460 €**	**345 €**	**27 €**

Source: Historical and forecasting Balance Spreadsheet and Balance Components

5.2.7. Tax Rate Assumptions

Since REN operates in Portugal, we assume the corporate tax rate in Portugal of 21%. Tax rate was lowered by 2% from 23% in 2015 to 21% in 2016. Therefore, we consider 21%.

5.3. Firm Value and Share price

Taking into consideration the previous assumptions, we construct the Balance spreadsheet (see Appendix 2) and Income Statement (see Appendix 3) for the years between 2012 and 2021.

The Free Cash-Flow to the Firm (FCFF) values are presented in table XIV.

Table XIV
FCFF Historical, explicit and perpetuity (thousands of euros

	Historical		Explicit				Perpetuity
	2015	2016	2017F	2018F	2019F	2020F	2021F
EBIT*(1-t)		**206 777 €**	**223 808 €**	**232 962 €**	**239 648 €**	**244 944 €**	**246 512 €**
Depreciation		215 535 €	211 173 €	219 810 €	226 118 €	231 116 €	
Change Working Capital		154 265 €	-93 215 €	1 327 €	460 €	345 €	27 €
Capex		171 247 €	178 593 €	186 255 €	191 843 €	196 255 €	
FCFF		**96 800 €**	**349 603 €**	**265 189 €**	**273 463 €**	**279 459 €**	**246 484 €**
(1+Ru)			1,07	1,14	1,21	1,29	

Source: REN Annual Report 2016; Results analysis, Excel file.

The FCFF in perpetuity is 246 484 million euros. The explicit period goes from 2017 to 2020 and the perpetuity starts in 2021.

The explicit and perpetuity FCFF were estimated and discounted with Ru. We computed Firm value by adding the tax savings, other non-operating assets and we minus this value by the Bankruptcy (which is calculating by multiplying the bankruptcy cost by the probability of bankruptcy (7,54%) in BBB rating companies, presented in appendix 7). The Firm Value is 4,300,616 thousand euros.

Having the computed Firm Value, we then remove the other liabilities and the net debt to calculate the Equity Value. The REN's Equity Value equals 1,599,086 €

thousand euros. Dividing by the number of outstanding shares, we reach a price target of 2.99 € (see table XV). The intrinsic value represents a potential appreciation of 11.74% when comparing with the comparing to its price in 31.12.2016 of 2.68 €, and represents an 8.89% upside potential when compared to the most recent share price registered of 2.75 € in 2.10.2017.

Table XV
Firm valuation and Price target

(+)	Value of Operations Explicit	1 003 508 €
(+)	Value of Operations Perpetuity	2 920 507 €
(+)	Tax Savings	450 569 €
(+)	Other Assets	227 600 €
(-)	Bankruptcy cost	73 968 €
=	Firm Value 2016	4 300 616 €
(-)	Other Liabilities	79 982 €
(-)	Net debt 2016	2 621 548 €
(-)	Minority 2016	No Minority
=	Equity Value 2016	1 599 086 €
/	Shares Outstanding	534 000
=	**Price Target(31/12/2016)**	**2,99 €**
	Stock Price(31/12/2016)	**2,68 €**
	Upside Potential	**11,74%**

6. Sensitivity Analysis

In order to estimate the stock price range and sensitivity to the variables, we perform a sensitivity analysis considering the cost of debt and unlevered cost of capital. Since REN aims to reduce its Cost of Debt in the next years, a sensitivity analysis was performed.

The sensitivity analysis is presented in table XVI.

Table XVI
Sensitivity Analysis with cost of debt and Ku

Rd/Ru	5,099%	5,599%	6,099%	6,599%	7,099%	7,599%	8,099%
5,41%	5,18	4,36	3,68	3,11	2,62	2,19	1,81
5,61%	5,13	4,32	3,64	3,07	2,57	2,15	1,77
5,81%	5,10	4,28	3,60	3,03	2,54	2,11	1,73
6,01%	5,06	4,25	**3,57**	2,99	2,50	2,07	1,70
6,21%	5,03	4,22	3,54	2,96	2,47	2,04	1,66
6,41%	5,00	4,19	3,51	2,93	2,44	2,01	1,63
6,61%	4,97	4,16	3,48	2,90	2,41	1,98	1,61

Source: Results analysis, Excel file

We can observe the impact of 0.2pp of Cost of Debt, *ceteris paribus*, changes the price of REN's shares by 1,18%. This is a good indicator and hint, since REN pretends to reduce its cost of debt and by achieving the reduction, it will increase the shares price according to sensitivity analysis.

In a ceteris paribus scenario for an unlevered cost of capital variation, we conclude that a variation of 0,5pp in the variable, will have an impact of 19.21% in the REN's price. We can observe that a variation in unlevered cost of capital will have a greater impact than a variation in cost of debt variable.

This sensitivity analysis complements the DCF valuation in a way that almost all scenarios set the intrinsic price superior to the value (2.68 €) registered in 31.12.2016. It reinforces the undervaluation of the stock in the target date, as reached previously in absolute analysis.

7. Monte Carlo Simulation

It was performed a Monte Carlo simulation to evaluate and give a solid estimation of the APV and sensitivity valuation of the REN's price target. The simulation inputs are

presented in Appendix 8. The Monte Carlo simulation was performed after 10 000 observations.

Figure 3 shows the frequency of observations according to the price intervals.

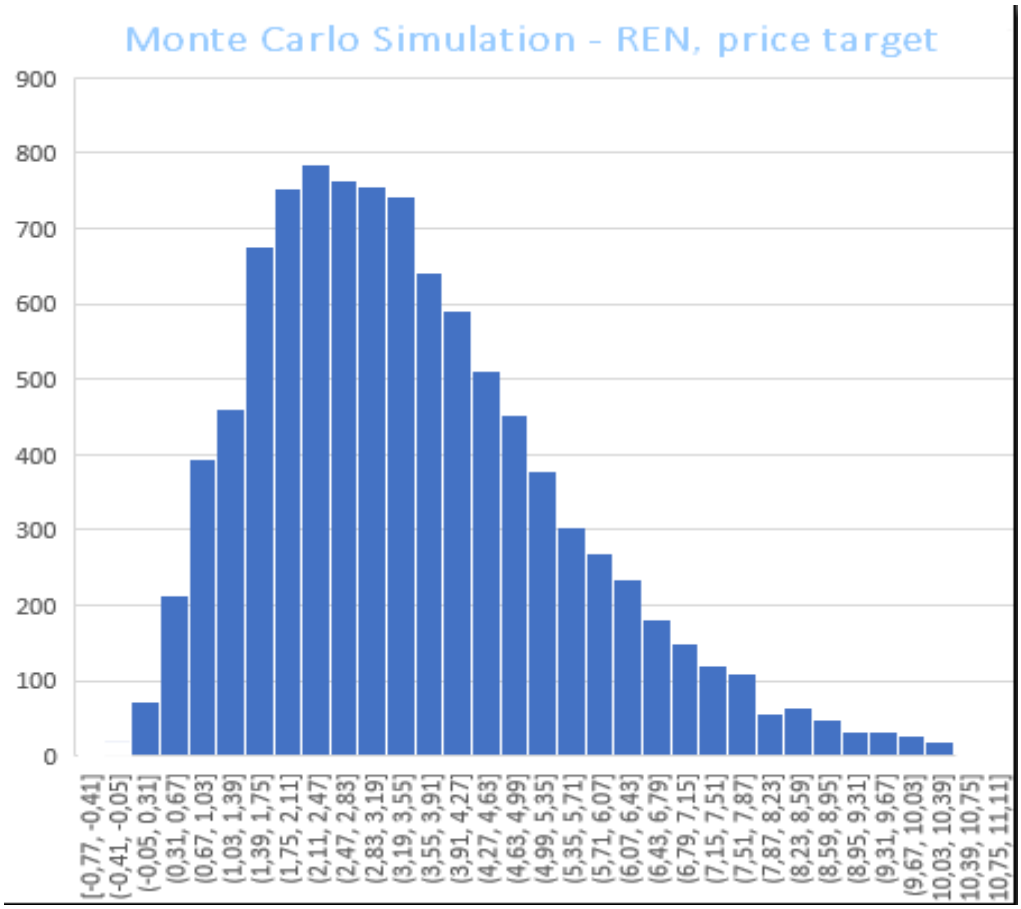


Figure 3 – Monte Carlo Simulation for Share Price of REN

After 10 000 observations, we can conclude that the average price value of REN's share is 3.62€ with a standard deviation of 1.80€. Monte Carlo simulation also suggests that the REN's stock price was undervalued at 31.12.2016.

8. Relative Valuation – Multiples approach

As the Absolute Valuation has a side of subjectivity according to the assumptions used to reach the price target, we decided to carry out a relative valuation analysis to eliminate the uncertain and complement the DCF valuation (Lie & Lie, 2001).

The Multiples values the company in relation to REN's peers. It analyses sector results and compare REN with its peers in the energy sector (Bhojraj, May, 2002). For that analysis, we start by selecting the peers group (Ruback, 2002) and choose the best pairs of REN.

We could have chosen companies from the energy sector. However, we consider to be more interesting to compare REN with other Transmission System Operator or another grid operator. Since REN is not an energy producer, we compare REN with other companies working on transportation and transmission of gas and electricity.

Next, we define the inferior threshold for the market capitalization and assets. The inferior threshold equals 1478 million euros, which is the capitalization of REN.

We exclude firms with total assets lower than the total assets of REN. The peer firms have to have the same structure of revenues as REN, a large percentage of services on total revenues, and a small percentage of sales on the revenues total.

We end up with four peer companies. The companies are ENAGAS SA, SNAM SPA, TERNA SPA and RED Electrica Corporation SA. We present selection in Appendix 9.

In order to achieve the arithmetic and harmonic average, we used the historical data from the 4 companies.

Considering the characteristic of the Firm, we use as multiples the EV/EBIT, EV/EBITDA and EV/Sales.

Appendix 10 presents the valuation using multiple peers.

The relative valuation indicates a target price between 3.66€ and 7.74€ (values with orange colour in the appendix 10) which is consistent with DCF valuation.

9. Conclusions

The valuation process aims to be as realistic and solid as possible. Sometimes valuation is inaccurate, even after all the effort put into work. We cannot predict the future accurately. The only thing we can do is try to be honest and critic about our valuation in order to provide the best information to shareholders and stakeholders, or sometimes to sellers and buyers.

As an uncertain science, valuation tends to be sometimes more realistic than other times. For this reason, we tried to choose the best model and methods to work with, in order to achieve a realistic price target taking all the assumptions into consideration, which were based on the company's perspectives for the future, the market environment, the industry and the country. Historical data was considered the basis for the valuation, since it is the only real data we had.

REN is planning to reduce its cost of debt by doing an optimization of the financials, which will be reflected in a reduction on cost of debt. The ratio will keep changing over the horizon period of valuation.

Therefore, we chose to carry out a DCF analysis applying APV in order to achieve a realistic price target. Although valuation is not precise or restricted to only one model, we must choose one. So, we tried to be the most confident and accurate about our choice, supported by the literature review analysis.

One of the limitations in the APV model is the Bankruptcy cost, which is extremely difficult to calculate. We considered 25% of the unlevered value, based on REN being high leverage and stable at the same time (with low risk of bankruptcy).

In an era when the consumption of energy is reaching its historical maximum, the predictions are positive and very optimistic for this sector. Thus, we assumed a positive growth on our best growth indicator: the revenues. After this assumption, all other assumptions were analysed individually, always considering these optimistic predictions for the future of REN and the market.

After carrying out an analysis on our data, the valuation process resulted in a price target of 2.99€ Euros per share.

The trading share price on 31st December 2016 was 2.68 Euros. Hence, our conclusion is that the share price was undervalued by 11.74%. Since we are conservative regarding the company's risk (even though is the steadiest in Portugal), our recommendation is: Neutral/Hold, assuming the possible risk of the assumptions taken being too optimistic.

We note that historically REN share price had not had an evolution with big peaks for the last historical years, whether in the positive or negative direction. Like a human being, the company also has more in its heart that it allows us to see, and the future behaviour reflects the one in the past (possibly improving the past mistakes). Thus, our

recommendation cannot ignore the past results and behaviour of REN as Portugal stable company.

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REN 1st semester Report 2017

REN Triennium Report 2015-2018 and forecasting assumptions

Bloomberg New Energy Outlook 2017

Executive report 2016 from TYNDP of Network Development (grid operators)

Quarterly Report Q1 2017 on European Electricity Markets, Volume 10, by European Commission

Appendix

Appendix 1 – Historical Balance Spreadsheet

	BALANCE SPREADSHEET(thousands of euros)	2012	2013	2014	2015	2016
	Assets					
	Non current Assets					
	Imobilizado Corpóreo					
capex	Property, plant and equipment	1515	1740	1690	1470	1360
capex	Cumulative depreciation	-688	-806	-1008	-776	-782
	Imobilizado Incorpóreo					
capex	Goodwill	3 774	3 774	3 774	3 774	3 397
capex	Intangible assets	6 706 408	6 891 483	7 052 799	7 273 902	7 444 045
capex	Cumulative amortizations	-2 814 944	-3 014 064	-3 214 570	-3 404 815	-3 618 335
o. Assets	Investments in associates and joint ventui	9 382	12 155	12 575	14 588	14 657
o. Assets	Available-for-sale financial assets	131 002	156 886	144 443	154 862	150 118
netdebt	Derivative financial instruments	6 853		21 970	10 157	20 425
netdebt	Other financial assets	112 583	102 274	93 482	7	14
WCNeeds	Trade and other receivables	70 451	81 588	86 182	133 676	10 145
o. Assets	Deferred tax assets	61 215	67 800	65 982	65 838	62 825
	Total - Non current assets	**4 287 551**	**4 302 830**	**4 267 319**	**4 252 683**	**4 087 869**
	Current Assets					
WCNeeds	Inventories	2 920	1 880	1 779	2 985	1 028
WCNeeds	Trade and other receivables	310 738	565 923	459 785	263 766	448 826
WCNeeds	Current income tax recoverable	14 318		10 219	5 358	0
netdebt	Oinstrumentos financeiros derivados	416		62 530		
netdebt	Other financial assets	8 864	22 728	8 864	1 510	1 317
net debt	Cash and cash equivalents	61 246	167 987	114 258	63 652	10 783
	Total - Current Assets	**398 502**	**758 518**	**657 435**	**337 271**	**461 954**
	TOTAL ASSETS	**4 686 053**	**5 061 348**	**4 924 754**	**4 589 954**	**4 549 823**
	EQUITY					
	Shareholders' Equity					
	Share capital	534 000	534 000	534 000	534 000	534 000
	Own shares	-10 728	-10 728	-10 728	-10 728	-10 728
	Reserves	231 753	271 634	315 621	325 619	319 204
	Retained earnings	149 002	163 356	183 896	196 253	216 527
	Other changes in equity				30	30
	Net profit for the year	123 561	121 303	112 777	116 115	100 183
	TOTAL EQUITY	**1 027 588**	**1 079 565**	**1 135 566**	**1 161 289**	**1 159 216**
	LIABILITIES					
	Non-current liabilities					
netdebt	Borrowings	1 535 495	2 430 159	2 207 514	1 891 245	2 298 543
netdebt	Liability for retirement benefits and others	105 808	126 231	126 617	129 217	125 673
netdebt	Derivative financial instruments	27 958	34 320	24 581	8 426	12 212
o.liabilities	Provisions	4 801	4 690	4 947	5 717	6 154
WCNeeds	Trade and other payables	360 895	370 298	328 228	332 232	318 126
o.liabilities	Deferred tax liabilities	82 797	73 956	92 270	88 249	73 027
	Total - Non-current liabilities	**2 117 754**	**3 039 654**	**2 784 157**	**2 455 086**	**2 833 735**
	Current Liabilities					
netdebt	Borrowings	1 170 400	250 325	396 952	650 755	216 596
o.liabilities	Provisions	2 419	1 213	2 369	1 171	801
WCNeeds	Trade and other payables	367 081	642 973	605 710	315 735	311 539
WCNeeds	Income tax payable	0	44 935			26 875
netdebt	Derivative financial instruments	811	2 683		5 919	1 063
	Total - Current liabilities	**1 540 711**	**942 129**	**1 005 031**	**973 580**	**556 874**
	TOTAL LIABILITIES	**3 658 465**	**3 981 783**	**3 789 188**	**3 428 666**	**3 390 609**
	TOTAL CAPITAL PRÓPRIO + PASSIVO	**4 686 053**	**5 061 348**	**4 924 754**	**4 589 955**	**4 549 825**

Appendix 2 – Forecasting Balance Spreadsheet

	BALANCE SPREADSHEET(thousands of euros)	2016	2017F	2018F	2019F	2020F	2021F
	Assets						
	Non current Assets						
	Imobilizado Corpóreo						
capex	Property, plant and equipment	1360	1 418	1 479	1 524	1 559	1 569
capex	Cumulative depreciation	-782	- 816	- 851	- 876	- 896	- 902
			-				
	Imobilizado Incorpóreo		-				
capex	Goodwill	3 397	3 397	3 397	3 397	3 397	3 397
capex	Intangible assets	7 444 045	7 635 578	7 834 944	8 040 032	8 249 652	8 460 614
capex	Cumulative amortizations	-3 618 335	- 3 773 562	- 3 935 447	- 4 053 511	- 4 146 742	- 4 173 695
o. Assets	Investments in associates and joint ve	14 657	14 018	14 592	15 010	15 342	15 440
o. Assets	Available-for-sale financial assets	150 118	150 642	156 804	161 304	164 869	165 924
netdebt	Derivative financial instruments	20 425	17 846	18 576	19 109	19 532	19 657
netdebt	Other financial assets	14	31 950	33 257	34 211	34 967	35 191
WCNeeds	Trade and other receivables	10 145	75 151	78 225	80 470	82 248	82 775
o. Assets	Deferred tax assets	62 825	65 259	67 928	69 877	71 422	71 879
	Total - Non current assets	**4 087 869**	**4 220 882**	**4 272 903**	**4 370 547**	**4 495 349**	**4 681 848**
	Current Assets						
WCNeeds	Inventories	1 028	1 908	1 986	2 043	2 089	2 102
WCNeeds	Trade and other receivables	448 826	436 809	454 674	467 723	478 060	481 120
WCNeeds	Current income tax recoverable	0	5 182	5 394	5 548	5 671	5 707
netdebt	Oinstrumentos financeiros derivados		21 366	22 240	22 879	23 384	23 534
netdebt	Other financial assets	1 317	3 965	4 127	4 246	4 340	4 367
net debt	Cash and cash equivalents	10 783	150 886	375 710	517 762	612 716	584 385
	Total - Current Assets	**461 954**	**620 117**	**864 132**	**1 020 202**	**1 126 259**	**1 101 215**
	TOTAL ASSETS	**4 549 823**	**4 840 999**	**5 137 034**	**5 390 749**	**5 621 609**	**5 783 063**
	EQUITY						
	Shareholders' Equity						
	Share capital	534 000	651 319	774 496	901 954	1 032 801	1 164 652
	Own shares	-10 728	-10 728	-10 728	-10 728	-10 728	-10 728
	Reserves	319 204	322 060	335 232	344 853	352 474	354 730
	Retained earnings	216 527	200 378	208 574	214 560	219 301	220 705
	Other changes in equity	30	0	0	0	0	0
	Net profit for the year	100 183	117 319	123 178	127 457	130 847	131 851
	TOTAL EQUITY	**1 159 216**	**1 280 347**	**1 430 752**	**1 578 096**	**1 724 696**	**1 861 210**
	LIABILITIES						
	Non-current liabilities						
netdebt	Borrowings	2 298 543	2 153 796	2 241 886	2 306 228	2 357 196	2 372 282
netdebt	Liability for retirement benefits and ot	125 673	127 923	133 155	136 977	140 004	140 900
netdebt	Derivative financial instruments	12 212	15 323	15 950	16 408	16 770	16 878
o.liabilities	Provisions	6 154	5 643	5 874	6 043	6 176	6 216
WCNeeds	Trade and other payables	318 126	328 076	341 495	351 296	359 059	361 357
o.liabilities	Deferred tax liabilities	73 027	84 874	88 345	90 880	92 889	93 483
	Total - Non-current liabilities	**2 833 735**	**2 715 635**	**2 826 705**	**2 907 831**	**2 972 094**	**2 991 116**
	Current Liabilities						
netdebt	Borrowings	216 596	416 543	433 580	446 023	455 880	458 798
o.liabilities	Provisions	801	1 459	1 518	1 562	1 596	1 607
WCNeeds	Trade and other payables	311 539	415 388	432 377	444 786	454 616	457 526
WCNeeds	Income tax payable	26 875	9 389	9 773	10 054	10 276	10 342
netdebt	Derivative financial instruments	1 063	2 238	2 330	2 396	2 449	2 465
	Total - Current liabilities	**556 874**	**845 017**	**879 578**	**904 822**	**924 818**	**930 737**
	TOTAL LIABILITIES	**3 390 609**	**3 560 652**	**3 706 283**	**3 812 653**	**3 896 913**	**3 921 853**
	TOTAL CAPITAL PRÓPRIO + PASSIVO	**4 549 825**	**4 840 999**	**5 137 034**	**5 390 749**	**5 621 609**	**5 783 063**

Appendix 3 –Historical and Forecasting Income Statement

Income Statement(thousands of euros)	2012	2013	2014	2015	2016	2017F	2018F	2019F	2020F	2021F
Revenues	811 288	788 845	756 043	819 145	739 451	**775 019**	**806 717**	**829 870**	**848 210**	**853 638**
EBITDA	516 884	515 986	507 066	489 779	477 278	**494 474**	**514 698**	**529 470**	**541 171**	**544 635**
Depreciation	202 650	195 734	204 105	209 684	215 535	211 173	219 810	226 118	231 116	232 595
EBIT	**314 234**	**320 252**	**302 961**	**280 095**	**261 743**	**283 301**	**294 888**	**303 352**	310 056	312 040
Interest	136 022	142 228	114 165	98 572	80 341	101 964	106 134	109 180	111 593	112 307
EBT	**178 212**	**178 024**	**188 796**	**181 523**	**181 402**	**181 337**	**188 754**	**194 171**	198 463	199 733
Tax	54 650	56 721	50 953	39 963	55 282	38 081	39 638	40 776	41 677	41 944
Extraordinary Contribution(CESE)			25 065	25 445	25 938	25 938	25 938	25 938	25 938	25 938
RL	**123 562**	**121 303**	**112 778**	**116 115**	**100 182**	**117 319**	**123 178**	**127 457**	**130 847**	**131 851**

Appendix 4 – Balance components, forecasting

	NETDEBT(thousands Euros)		2016	2017F	2018F	2019F	2020F	2021F
	Derivative financial instruments		20 425	17 846	18 576	19 109	19 532	19 657
	Other financial assets		14	31 950	33 257	34 211	34 967	35 191
(-)	**Non-current Assets**		**20 439**	**49 796**	**51 833**	**53 320**	**54 499**	**54 848**
	Oinstrumentos financeiros derivados		-	21 366	22 240	22 879	23 384	23 534
	Other financial assets		1 317	3 965	4 127	4 246	4 340	4 367
	Cash and cash equivalents		10 783	150 886	375 710	517 762	612 716	584 385
(-)	**Current Assets**		**12 100**	**176 218**	**402 077**	**544 886**	**640 440**	**612 286**
	Borrowings		2 298 543	2 153 796	2 241 886	2 306 228	2 357 196	2 372 282
	Liability for retirement benefits and others		125 673	127 923	133 155	136 977	140 004	140 900
	Derivative financial instruments		12 212	15 323	15 950	16 408	16 770	16 878
(+)	**Non-current Liabilities**		**2 436 428**	**2 297 042**	**2 390 991**	**2 459 613**	**2 513 970**	**2 530 060**
	Borrowings		216 596	416 543	433 580	446 023	455 880	458 798
	Derivative financial instruments		1 063	2 238	2 330	2 396	2 449	2 465
(+)	**Currents Liabilities**		**217 659**	**418 781**	**435 909**	**448 420**	**458 330**	**461 263**
	NETDEBT TOTAL		**2 621 548**	**2 489 809**	**2 372 990**	**2 309 826**	**2 277 361**	**2 324 189**
		Equity	853 204	973 378	1 109 728	1 246 807	1 385 275	1 519 382
		D/(D+E)	**75,45%**	**71,89%**	**68,14%**	**64,94%**	**62,18%**	**60,47%**
		E/(E+D)	24,55%	28,11%	31,86%	35,06%	37,82%	39,53%

	Working Capital Needs(thousands euros)	2016	2017F	2018F	2019F	2020F	2021F
	Trade and other receivables	10 145	75 151	78 225	80 470	82 248	82 775
(+)	**Non-current Assets**	**10 145**	**75 151**	**78 225**	**80 470**	**82 248**	**82 775**
	Inventories	1 028	1 908	1 986	2 043	2 089	2 102
	Trade and other receivables	448 826	436 809	454 674	467 723	478 060	481 120
	Current income tax recoverable	-	5 182	5 394	5 548	5 671	5 707
(+)	**Current Assets**	**449 854**	**438 717**	**456 661**	**469 767**	**480 149**	**483 222**
	Trade and other payables	318 126	328 076	341 495	351 296	359 059	361 357
(-)	**Non-current Liabilities**	**318 126**	**328 076**	**341 495**	**351 296**	**359 059**	**361 357**
	Trade and other payables	311 539	415 388	432 377	444 786	454 616	457 526
	Income tax payable	26 875	9 389	9 773	10 054	10 276	10 342
(-)	**Currents Liabilities**	**338 414**	**424 777**	**442 150**	**454 840**	**464 892**	**467 867**
	Working Capital Needs TOTAL	**- 196 541**	**-238 985**	**- 248 760**	**- 255 899**	**- 261 554**	**- 263 228**

Other assets(thousands euros)	2016	2017F	2018F	2019F	2020F	2021F
(+) Investments in associates and joint ventur	14 657	14 018	14 592	15 010	15 342	15 440
(+) Available-for-sale financial assets	150 118	150 642	156 804	161 304	164 869	165 924
(+) Deferred tax assets	62 825	65 259	67 928	69 877	71 422	71 879
Outros Ativos TOTAL	**227 600**	**229 919**	**239 323**	**246 192**	**251 632**	**253 243**

Other liabilities(thousands euros)	2016	2017F	2018F	2019F	2020F	2021F
(+) Provisions(Current)	6 154	5 643	5 874	6 043	6 176	6 216
(+) Deferred tax liabilities	73 027	84 874	88 345	90 880	92 889	93 483
(+) Provisions(non-current)	801	1 459	1 518	1 562	1 596	1 607
Outros Passivos TOTAL	**79 982**	**91 976**	**95 737**	**98 485**	**100 662**	**101 306**

CAPEX - Assumptions according to revenu	2016	2017F	2018F	2019F	2020F	2021F
Construction Revenues are equal to CAPEX(included at Inc.Stat.)						
Construction Revenues or	**171247**	**178593,5**	**186255,16**	**191842,812**	**196255,2**	
(According to Electricity and N.Gas Grow		4,20%	4,20%	2,96%	2,27%	
Ponderation with the triennium perspectives.						
Between 175000 and 200000 until 2019.						
Increasing due to internationalization expenditures)						

Appendix 5 – Country Risk Premium, Damodaran(2017)

Country	GDP billions	rating	*Adj. Default Spread*	*Total Risk Premium*	*Country Risk Premium*	*Corporate Tax Rate*
Portugal	199	Ba1	2,89%	9,24%	3,55%	21,00%

Appendix 6 – Damodaran Table(2017) default spread BBB, Small Firms

Interest Coverage Ratio	*Rating*	*Spread*
> 8.5	AAA	0.75%
6.5-8.5	AA	1.00%
5.5 - 6.5	A+	1.50%
4.25- 5.5	A	1.80%
3- 4.25	A-	2.00%
2.5-3	BBB	2.25%
2- 2.5	BB	3.50%
1.75-2	B+	4.75%
1.5-1.75	B	6.50%
1.25-1.5	B-	8.00%
0.8-1.25	CCC	10.00%
0.65-0.8	CC	11.50%
0.2-0.65	C	12.70%
<0.2	D	14.00%

Appendix 7 – BankRuptcy probability – Tables by Damodaran(2017)

nterest co	Interest cov	RATING	Interest rate	Bankruptcy
Low	High			Probability
-100000	0,499999	D2/D	16,35%	100,00%
0,5	0,799999	C2/C	12,35%	85,00%
0,8	1,249999	Ca2/CC	10,35%	70,00%
1,25	1,499999	Caa/CCC	9,35%	59,01%
1,5	1,999999	B3/B-	8,35%	45,00%
2	2,499999	Ba1/BB+	7,35%	10,00%
2,5	2,999999	Ba2/BB	6,35%	16,63%
3	3,499999	B1/B+	5,60%	25,00%
3,5	3,9999999	B2/B	5,10%	36,80%
4	4,499999	Baa2/BBB	4,10%	7,54%
4,5	5,999999	A3/A-	3,55%	2,50%
6	7,499999	A2/A	3,35%	0,66%
7,50	9,499999	A1/A+	3,25%	0,60%
9,5	12,499999	Aa2/AA	3,05%	1%
12,5	100000	Aaa/AAA	2,75%	0%

Appendix 8 – Monte Carlo simulation statistics

Statistics	forecasting values
Basis Case	2.99
Observations	10000
Std.dev	1,80 €
Mean	3,62 €
Curtose	6,82
Median	3,23
Mean Std.dev	1,66
Minimum	0,23
Maximum	12.04

Distribution	Variable	Mean	Std. Dev
NORMAL	EBITDA/Sales	0,645	0,030
NORMAL	Trade Debtors/Sales	0,621	0,055
NORMAL	Trade Creditors/Sales	0,852	0,094
NORMAL	Depreciation/ Ativos	0,291	0,013
NORMAL	Capex/Sales	0,247	0,005
NORMAL	Cash and Equivilents/Sales	0,122	0,120
NORMAL	Other Assets/Sales	0,308	0,023
NORMAL	Other Assets non current/sale	0,308	0,021
NORMAL	g sales	0,048	0,004
NORMAL	g perpetual	0,006	0,001
Uniforme("0,5 - 0,90")	Bu	0,692	0,102
Uniforme("4,08 - 8,08")	Kd	0,061	0,012

Appendix 9 - Peers group selection

	PEERS GROUP		
	Market capitalization	Total Assets	Sales
REN	**1478**	**>4 686**	Services>Sales
RED Elec. Corp. SA	9869	10550	Services>Sales
ENAGAS SA	5737	9247	Services>Sales
SNAM SPA	14289	24880	Services>Sales
TERNA SPA	9921	14996	Services>Sales

Appendix 10 – Multiples, Relative Valuation

MULTIPLES APPROACH				Dividend yield	EV/EBITDA	EV/SALES	EV/EBIT
RED Electrica corporation SA				4,24%	11,72	9,01	17,36
ENAGAS SA				5,26%	13,23	9,82	19,11
SNAM SPA				5,38%	12,52	9,82	17,57
TERNA SPA				3,89%	11,54	8,47	17,20
Aritmethic Mean				4,69%	**12,25**	**9,28**	**17,81**
Harmonic Mean				4,60%	**12,21**	**9,24**	**17,78**
					EBITDA	SALES	EBIT
REN		Share	0,19	6,30%	477 278,00 €	739 451,00 €	261 743,00 €
						Minority	0,00 €
						o.non-cur. Liabilit	79 181,00 €
						Net Debt	2 621 548,00 €
						Outstanding share	534 000,00 €
Harmonic mean multiplying by REN input				0,12337351	3 128 390,24 €	4 134 425,44 €	1 952 291,07 €
dividing by outstanding shares				12 cent dividend	5,86 €	7,74 €	3,66 €